



SUBSTITUTE SEQUENCE LISTING

<110> Oppermann, Hermann
Tai, Mei-Sheng
McCartney, John

<120> Modified TGF-beta Superfamily Proteins

<130> STK-075

<140>

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<170> PatentIn Ver. 2.0

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<213> Drosophila melanogaster

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<223> 60-A

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Gly Cys His
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Glu Lys Val Val Leu Lys Asn Tyr Gln Asp Met Val Val Glu Gly Cys
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Gly Cys Arg
35

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Cys Gly Cys Arg
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Gly Cys Arg
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Gly Cys Ser
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Gly Cys Arg
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<213> Gallus gallus

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Gly Val Pro Thr Leu Ile Tyr Asn Tyr Glu Gly Met Lys Val Ala Glu
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Cys Gly Cys Arg
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<213> *Drosophila melanogaster*

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20 25 30
Gly Cys Arg
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<213> *Mus musculus*

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Gly Cys Arg
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Gly Ser Ile Ala Tyr Lys Glu Tyr Glu Asp Met Ile Ala Thr Arg Cys
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Thr Cys Arg
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Arg Pro Ile Ala Phe Asp Asp Asp Leu Ser Phe Leu Asp Asp Asn Leu
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Val Tyr His Ile Leu Arg Lys His Ser Ala Lys Arg Cys Gly Cys Ile
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<223> Inhibin Alpha

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Ala Ala Leu Pro Gly Thr Met Arg Pro Leu His Val Arg Thr Thr Ser
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Asp Gly Gly Tyr Ser Phe Lys Tyr Glu Thr Val Pro Asn Leu Leu Thr
20 25 30
Gln His Cys Ala Cys Ile
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Val Pro Thr Lys Leu Arg Pro Met Ser Met Leu Tyr Tyr Asp Asp Gly
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Gln Asn Ile Ile Lys Lys Asp Ile Gln Asn Met Ile Val Glu Glu Cys
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Gly Cys Ser
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<213> Homo sapiens

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Tyr Asn Ile Val Lys Arg Asp Val Pro Asn Met Ile Val Glu Glu Cys
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Gly Cys Ala
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20 25 30
Gly Cys Ser
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Val Pro Thr Ala Tyr Ala Gly Lys Leu Leu Ile Ser Leu Ser Glu Glu
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Arg Ile Ser Ala His His Val Pro Asn Met Val Ala Thr Glu Cys Gly
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Cys Arg

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Arg Val Leu Leu Glu His His Lys Asp Met Ile Val Glu Glu Cys Gly
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Cys Leu

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20 25 30

Gly Cys His
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<400> 27
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Asn Asn Val Ile Leu Arg Arg Glu Arg Asn Met Val Val Gln Ala Cys
20 25 30

Gly Cys His
35

<210> 28
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<213> Drosophila melanogaster

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<400> 28
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1 5 10 15

Asp Ile Ile Asp Leu Thr Lys Tyr Gln Lys Ala Val Ala Lys Glu Cys
20 25 30

Gly Cys His
35

<210> 29
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<213> Homo sapiens

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<400> 29
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Lys Pro Lys Val Glu Gln Leu Ser Asn Met Ile Val Arg Ser Cys Lys
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Cys Ser

<210> 30
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<400> 30
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Thr Pro Lys Ile Glu Gln Leu Ser Asn Met Ile Val Lys Ser Cys Lys
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Cys Ser

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Thr Pro Lys Val Glu Gln Leu Ser Asn Met Val Val Lys Ser Cys Lys
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Cys Ser

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<212> PRT
<213> Gallus gallus

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<223> TGF-Beta4

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Val Pro Gln Thr Leu Asp Pro Leu Pro Ile Ile Tyr Tyr Val Gly Arg
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Asn Val Arg Val Glu Gln Leu Ser Asn Met Val Val Arg Ala Cys Lys
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Cys Ser

<210> 33
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<212> PRT
<213> *Xenopus laevis*

<220>
<223> TGF-Beta5

<400> 33
Val Pro Asp Val Leu Glu Pro Leu Pro Ile Ile Tyr Tyr Val Gly Arg
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Thr Ala Lys Val Glu Gln Leu Ser Asn Met Val Val Arg Ser Cys Asn
20 25 30
Cys Ser

<210> 34
<211> 35
<212> PRT
<213> *Strongylocentrotus purpuratus*

<220>
<223> UNIVIN

<400> 34
Ala Pro Thr Lys Leu Ser Gly Ile Ser Met Leu Tyr Phe Asp Asn Asn
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Glu Asn Val Val Leu Arg Gln Tyr Glu Asp Met Val Val Glu Ala Cys
20 25 30
Gly Cys Arg
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<210> 35
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<212> PRT
<213> *Xenopus laevis*

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Gly Cys Arg
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 Arg Ser Leu Arg Ala Ala Ala Pro His Ser Phe Val Ala Leu Trp Ala
 5 10 15

ccc ctg ttc ctg ctg cgc tcc gcc ctg gcc gac ttc agc ctg gac aac 153
 Pro Leu Phe Leu Leu Arg Ser Ala Leu Ala Asp Phe Ser Leu Asp Asn
 20 25 30 35

gag gtg cac tcg agc ttc atc cac cgg cgc ctc cgc agc cag gag cgg 201
 Glu Val His Ser Ser Phe Ile His Arg Arg Leu Arg Ser Gln Glu Arg
 40 45 50

cgg gag atg cag cgc gag atc ctc tcc att ttg ggc ttg ccc cac cgc Arg Glu Met Gln Arg Glu Ile Leu Ser Ile Leu Gly Leu Pro His Arg 55 60 65	249
ccg cgc ccg cac ctc cag ggc aag cac aac tcg gca ccc atg ttc atg Pro Arg Pro His Leu Gln Gly Lys His Asn Ser Ala Pro Met Phe Met 70 75 80	297
ctg gac ctg tac aac gcc atg gcg gtg gag gag ggc ggc ggg ccc ggc Leu Asp Leu Tyr Asn Ala Met Ala Val Glu Glu Gly Gly Gly Pro Gly 85 90 95	345
ggc cag ggc ttc tcc tac ccc tac aag gcc gtc ttc agt acc cag ggc Gly Gln Gly Phe Ser Tyr Pro Tyr Lys Ala Val Phe Ser Thr Gln Gly 100 105 110 115	393
ccc cct ctg gcc agc ctg caa gat agc cat ttc ctc acc gac gcc gac Pro Pro Leu Ala Ser Leu Gln Asp Ser His Phe Leu Thr Asp Ala Asp 120 125 130	441
atg gtc atg agc ttc gtc aac ctc gtg gaa cat gac aag gaa ttc ttc Met Val Met Ser Phe Val Asn Leu Val Glu His Asp Lys Glu Phe Phe 135 140 145	489
cac cca cgc tac cac cat cga gag ttc cgg ttt gat ctt tcc aag atc His Pro Arg Tyr His His Arg Glu Phe Arg Phe Asp Leu Ser Lys Ile 150 155 160	537
cca gaa ggg gaa gct gtc acg gca gcc gaa ttc cgg atc tac aag gac Pro Glu Gly Glu Ala Val Thr Ala Ala Glu Phe Arg Ile Tyr Lys Asp 165 170 175	585
tac atc cgg gaa cgc ttc gac aat gag acg ttc cgg atc agc gtt tat Tyr Ile Arg Glu Arg Phe Asp Asn Glu Thr Phe Arg Ile Ser Val Tyr 180 185 190 195	633
cag gtg ctc cag gag cac ttg ggc agg gaa tcg gat ctc ttc ctg ctc Gln Val Leu Gln Glu His Leu Gly Arg Glu Ser Asp Leu Phe Leu Leu 200 205 210	681
gac agc cgt acc ctc tgg gcc tcg gag gag ggc tgg ctg gtg ttt gac Asp Ser Arg Thr Leu Trp Ala Ser Glu Glu Gly Trp Leu Val Phe Asp 215 220 225	729
atc aca gcc acc agc aac cac tgg gtg gtc aat ccg cgg cac aac ctg Ile Thr Ala Thr Ser Asn His Trp Val Val Asn Pro Arg His Asn Leu 230 235 240	777
ggc ctg cag ctc tcg gtg gag acg ctg gat ggg cag agc atc aac ccc Gly Leu Gln Leu Ser Val Glu Thr Leu Asp Gly Gln Ser Ile Asn Pro 245 250 255	825
aag ttg gcg ggc ctg att ggg cgg cac ggg ccc cag aac aag cag ccc Lys Leu Ala Gly Leu Ile Gly Arg His Gly Pro Gln Asn Lys Gln Pro 260 265 270 275	873

ttc atg gtg gct ttc ttc aag gcc acg gag gtc cac ttc cgc agc atc	921
Phe Met Val Ala Phe Phe Lys Ala Thr Glu Val His Phe Arg Ser Ile	
280 285 290	
cgg tcc acg ggg agc aaa cag cgc agc cag aac cgc tcc aag acg ccc	969
Arg Ser Thr Gly Ser Lys Gln Arg Ser Gln Asn Arg Ser Lys Thr Pro	
295 300 305	
aag aac cag gaa gcc ctg cgg atg gcc aac gtg gca gag aac agc agc	1017
Lys Asn Gln Glu Ala Leu Arg Met Ala Asn Val Ala Glu Asn Ser Ser	
310 315 320	
agc gac cag agg cag gcc tgt aag aag cac gag ctg tat gtc agc ttc	1065
Ser Asp Gln Arg Gln Ala Cys Lys Lys His Glu Leu Tyr Val Ser Phe	
325 330 335	
cga gac ctg ggc tgg cag gac tgg atc atc gcg cct gaa ggc tac gcc	1113
Arg Asp Leu Gly Trp Gln Asp Trp Ile Ile Ala Pro Glu Gly Tyr Ala	
340 345 350 355	
gcc tac tac tgt gag ggg gag tgt gcc ttc cct ctg aac tcc tac atg	1161
Ala Tyr Tyr Cys Glu Gly Glu Cys Ala Phe Pro Leu Asn Ser Tyr Met	
360 365 370	
aac gcc acc aac cac gcc atc gtg cag acg ctg gtc cac ttc atc aac	1209
Asn Ala Thr Asn His Ala Ile Val Gln Thr Leu Val His Phe Ile Asn	
375 380 385	
ccg gaa acg gtg ccc aag ccc tgc tgt gcg ccc acg cag ctc aat gcc	1257
Pro Glu Thr Val Pro Lys Pro Cys Cys Ala Pro Thr Gln Leu Asn Ala	
390 395 400	
atc tcc gtc ctc tac ttc gat gac agc tcc aac gtc atc ctg aag aaa	1305
Ile Ser Val Leu Tyr Phe Asp Asp Ser Ser Asn Val Ile Leu Lys Lys	
405 410 415	
tac aga aac atg gtg gtc cgg gcc tgt ggc tgc cac tagctcctcc	1351
Tyr Arg Asn Met Val Arg Ala Cys Gly Cys His	
420 425 430	
gagaattcag accctttggg gccaaagtttt tctggatcct ccattgctcg ccttggccag 1411	
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<211> 431

<212> PRT

<213> Homo sapiens

<400> 39

Met	His	Val	Arg	Ser	Leu	Arg	Ala	Ala	Ala	Pro	His	Ser	Phe	Val	Ala
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Leu	Trp	Ala	Pro	Leu	Phe	Leu	Leu	Arg	Ser	Ala	Leu	Ala	Asp	Phe	Ser
			20					25					30		
Leu	Asp	Asn	Glu	Val	His	Ser	Ser	Phe	Ile	His	Arg	Arg	Leu	Arg	Ser
		35					40					45			
Gln	Glu	Arg	Arg	Glu	Met	Gln	Arg	Glu	Ile	Leu	Ser	Ile	Leu	Gly	Leu
	50					55					60				
Pro	His	Arg	Pro	Arg	Pro	His	Leu	Gln	Gly	Lys	His	Asn	Ser	Ala	Pro
	65					70				75					80
Met	Phe	Met	Leu	Asp	Leu	Tyr	Asn	Ala	Met	Ala	Val	Glu	Glu	Gly	Gly
				85					90					95	
Gly	Pro	Gly	Gly	Gln	Gly	Phe	Ser	Tyr	Pro	Tyr	Lys	Ala	Val	Phe	Ser
		100						105					110		
Thr	Gln	Gly	Pro	Pro	Leu	Ala	Ser	Leu	Gln	Asp	Ser	His	Phe	Leu	Thr
		115					120					125			
Asp	Ala	Asp	Met	Val	Met	Ser	Phe	Val	Asn	Leu	Val	Glu	His	Asp	Lys
	130					135					140				
Glu	Phe	Phe	His	Pro	Arg	Tyr	His	His	Arg	Glu	Phe	Arg	Phe	Asp	Leu
145					150					155					160
Ser	Lys	Ile	Pro	Glu	Gly	Glu	Ala	Val	Thr	Ala	Ala	Glu	Phe	Arg	Ile
				165					170					175	
Tyr	Lys	Asp	Tyr	Ile	Arg	Glu	Arg	Phe	Asp	Asn	Glu	Thr	Phe	Arg	Ile
		180						185					190		
Ser	Val	Tyr	Gln	Val	Leu	Gln	Glu	His	Leu	Gly	Arg	Glu	Ser	Asp	Leu
		195					200					205			
Phe	Leu	Leu	Asp	Ser	Arg	Thr	Leu	Trp	Ala	Ser	Glu	Glu	Gly	Trp	Leu
	210					215					220				
Val	Phe	Asp	Ile	Thr	Ala	Thr	Ser	Asn	His	Trp	Val	Val	Asn	Pro	Arg
225					230					235					240
His	Asn	Leu	Gly	Leu	Gln	Leu	Ser	Val	Glu	Thr	Leu	Asp	Gly	Gln	Ser
			245						250					255	

Ile Asn Pro Lys Leu Ala Gly Leu Ile Gly Arg His Gly Pro Gln Asn
 260 265 270
 Lys Gln Pro Phe Met Val Ala Phe Phe Lys Ala Thr Glu Val His Phe
 275 280 285
 Arg Ser Ile Arg Ser Thr Gly Ser Lys Gln Arg Ser Gln Asn Arg Ser
 290 295 300
 Lys Thr Pro Lys Asn Gln Glu Ala Leu Arg Met Ala Asn Val Ala Glu
 305 310 315 320
 Asn Ser Ser Ser Asp Gln Arg Gln Ala Cys Lys Lys His Glu Leu Tyr
 325 330 335
 Val Ser Phe Arg Asp Leu Gly Trp Gln Asp Trp Ile Ile Ala Pro Glu
 340 345 350
 Gly Tyr Ala Ala Tyr Tyr Cys Glu Gly Glu Cys Ala Phe Pro Leu Asn
 355 360 365
 Ser Tyr Met Asn Ala Thr Asn His Ala Ile Val Gln Thr Leu Val His
 370 375 380
 Phe Ile Asn Pro Glu Thr Val Pro Lys Pro Cys Cys Ala Pro Thr Gln
 385 390 395 400
 Leu Asn Ala Ile Ser Val Leu Tyr Phe Asp Asp Ser Ser Asn Val Ile
 405 410 415
 Leu Lys Lys Tyr Arg Asn Met Val Val Arg Ala Cys Gly Cys His
 420 425 430

<210> 40
 <211> 98
 <212> PRT
 <213> Homo sapiens

<220>
 <223> TGF-Beta1

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 1 5 10 15
 Lys Trp Ile His Glu Pro Lys Gly Tyr His Ala Asn Phe Cys Leu Gly
 20 25 30
 Pro Cys Pro Tyr Ile Trp Ser Leu Asp Thr Gln Tyr Ser Lys Val Leu
 35 40 45
 Ala Leu Tyr Asn Gln His Asn Pro Gly Ala Ser Ala Ala Pro Cys Cys
 50 55 60

Val Pro Gln Ala Leu Glu Pro Leu Pro Ile Val Tyr Tyr Val Gly Arg
65 70 75 80

Lys Pro Lys Val Glu Gln Leu Ser Asn Met Ile Val Arg Ser Cys Lys
85 90 95

Cys Ser

<210> 41

<211> 98

<212> PRT

<213> Homo sapiens

<220>

<223> TGF-Beta2

<400> 41

Cys Cys Leu Arg Pro Leu Tyr Ile Asp Phe Lys Arg Asp Leu Gly Trp
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Lys Trp Ile His Glu Pro Lys Gly Tyr Asn Ala Asn Phe Cys Ala Gly
20 25 30

Ala Cys Pro Tyr Leu Trp Ser Ser Asp Thr Gln His Ser Arg Val Leu
35 40 45

Ser Leu Tyr Asn Thr Ile Asn Pro Glu Ala Ser Ala Ser Pro Cys Cys
50 55 60

Val Ser Gln Asp Leu Glu Pro Leu Thr Ile Leu Tyr Tyr Ile Gly Lys
65 70 75 80

Thr Pro Lys Ile Glu Gln Leu Ser Asn Met Ile Val Lys Ser Cys Lys
85 90 95

Cys Ser

<210> 42

<211> 98

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<213> Homo sapiens

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Cys Cys Val Arg Pro Leu Tyr Ile Asp Phe Arg Gln Asp Leu Gly Trp
1 5 10 15

Lys Trp Val His Glu Pro Lys Gly Tyr Tyr Ala Asn Phe Cys Ser Gly
20 25 30

Pro Cys Pro Tyr Leu Arg Ser Ala Asp Thr Thr His Ser Thr Val Leu
35 40 45

Gly Leu Tyr Asn Thr Leu Asn Pro Glu Ala Ser Ala Ser Pro Cys Cys
50 55 60

Val Pro Gln Asp Leu Glu Pro Leu Thr Ile Leu Tyr Tyr Val Gly Arg
65 70 75 80

Thr Pro Lys Val Glu Gln Leu Ser Asn Met Val Val Lys Ser Cys Lys
85 90 95

Cys Ser

<210> 43
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<212> PRT
<213> Gallus gallus

<220>
<223> TGF-Beta4

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Lys Trp Ile His Glu Pro Lys Gly Tyr Met Ala Asn Phe Cys Met Gly
20 25 30

Pro Cys Pro Tyr Ile Trp Ser Ala Asp Thr Gln Tyr Thr Lys Val Leu
35 40 45

Ala Leu Tyr Asn Gln His Asn Pro Gly Ala Ser Ala Ala Pro Cys Cys
50 55 60

Val Pro Gln Thr Leu Asp Pro Leu Pro Ile Ile Tyr Tyr Val Gly Arg
65 70 75 80

Asn Val Arg Val Glu Gln Leu Ser Asn Met Val Val Arg Ala Cys Lys
85 90 95

Cys Ser

<210> 44
<211> 98
<212> PRT
<213> Xenopus laevis

<220>
<223> TGF-Beta5

<400> 44

Cys Cys Val Lys Pro Leu Tyr Ile Asn Phe Arg Lys Asp Leu Gly Trp
1 5 10 15

Lys Trp Ile His Glu Pro Lys Gly Tyr Glu Ala Asn Tyr Cys Leu Gly
20 25 30

Asn Cys Pro Tyr Ile Trp Ser Met Asp Thr Gln Tyr Ser Lys Val Leu
35 40 45

Ser Leu Tyr Asn Gln Asn Asn Pro Gly Ala Ser Ile Ser Pro Cys Cys
50 55 60

Val Pro Asp Val Leu Glu Pro Leu Pro Ile Ile Tyr Tyr Val Gly Arg
65 70 75 80

Thr Ala Lys Val Glu Gln Leu Ser Asn Met Val Val Arg Ser Cys Asn
85 90 95

Cys Ser

<210> 45

<211> 102

<212> PRT

<213> *Drosophila melanogaster*

<220>

<223> DPP

<400> 45

Cys Arg Arg His Ser Leu Tyr Val Asp Phe Ser Asp Val Gly Trp Asp
1 5 10 15

Asp Trp Ile Val Ala Pro Leu Gly Tyr Asp Ala Tyr Tyr Cys His Gly
20 25 30

Lys Cys Pro Phe Pro Leu Ala Asp His Phe Asn Ser Thr Asn His Ala
35 40 45

Val Val Gln Thr Leu Val Asn Asn Met Asn Pro Gly Lys Val Pro Lys
50 55 60

Ala Cys Cys Val Pro Thr Gln Leu Asp Ser Val Ala Met Leu Tyr Leu
65 70 75 80

Asn Asp Gln Ser Thr Val Val Leu Lys Asn Tyr Gln Glu Met Thr Val
85 90 95

Val Gly Cys Gly Cys Arg
100

<210> 46
 <211> 102
 <212> PRT
 <213> *Xenopus laevis*

<220>
 <223> VG1

<400> 46
 Cys Lys Lys Arg His Leu Tyr Val Glu Phe Lys Asp Val Gly Trp Gln
 1 5 10 15
 Asn Trp Val Ile Ala Pro Gln Gly Tyr Met Ala Asn Tyr Cys Tyr Gly
 20 25 30
 Glu Cys Pro Tyr Pro Leu Thr Glu Ile Leu Asn Gly Ser Asn His Ala
 35 40 45
 Ile Leu Gln Thr Leu Val His Ser Ile Glu Pro Glu Asp Ile Pro Leu
 50 55 60
 Pro Cys Cys Val Pro Thr Lys Met Ser Pro Ile Ser Met Leu Phe Tyr
 65 70 75 80
 Asp Asn Asn Asp Asn Val Val Leu Arg His Tyr Glu Asn Met Ala Val
 85 90 95
 Asp Glu Cys Gly Cys Arg
 100

<210> 47
 <211> 102
 <212> PRT
 <213> *Mus musculus*

<220>
 <223> VGR1

<400> 47
 Cys Lys Lys His Glu Leu Tyr Val Ser Phe Gln Asp Leu Gly Trp Gln
 1 5 10 15
 Asp Trp Ile Ile Ala Pro Lys Gly Tyr Ala Ala Asn Tyr Cys Asp Gly
 20 25 30
 Glu Cys Ser Phe Pro Leu Asn Ala His Met Asn Ala Thr Asn His Ala
 35 40 45
 Ile Val Gln Thr Leu Val His Leu Met Asn Pro Glu Tyr Val Pro Lys
 50 55 60
 Pro Cys Cys Ala Pro Thr Lys Leu Asn Ala Ile Ser Val Leu Tyr Phe
 65 70 75 80

Asp Asp Asn Ser Asn Val Ile Leu Lys Lys Tyr Arg Asn Met Val Val
85 90 95

Arg Ala Cys Gly Cys His
100

<210> 48
<211> 118
<212> PRT
<213> Drosophila melanogaster

<220>
<223> 60A

<400> 48
Cys Gln Met Gln Thr Leu Tyr Ile Asp Phe Lys Asp Leu Gly Trp His
1 5 10 15

Asp Trp Ile Ile Ala Pro Glu Gly Tyr Gly Ala Phe Tyr Cys Ser Gly
20 25 30

Glu Cys Asn Phe Pro Leu Asn Ala His Met Asn Ala Thr Asn His Ala
35 40 45

Ile Val Gln Thr Leu Val His Leu Leu Glu Pro Lys Lys Val Pro Lys
50 55 60

Pro Cys Cys Ala Pro Thr Arg Leu Gly Ala Leu Pro Val Leu Tyr His
65 70 75 80

Pro Cys Cys Ala Pro Thr Arg Leu Gly Ala Leu Pro Val Leu Tyr His
85 90 95

Leu Asn Asp Glu Asn Val Asn Leu Lys Lys Tyr Arg Asn Met Ile Val
100 105 110

Lys Ser Cys Gly Cys His
115

<210> 49
<211> 101
<212> PRT
<213> Homo sapiens

<220>
<223> BMP-2A

<400> 49
Cys Lys Arg His Pro Leu Tyr Val Asp Phe Ser Asp Val Gly Trp Asn
1 5 10 15

Asp Trp Ile Val Ala Pro Pro Gly Tyr His Ala Phe Tyr Cys His Gly
20 25 30

Glu Cys Pro Phe Pro Leu Ala Asp His Leu Asn Ser Thr Asn His Ala
 35 40 45
 Ile Val Gln Thr Leu Val Asn Ser Val Asn Ser Lys Ile Pro Lys Ala
 50 55 60
 Cys Cys Val Pro Thr Glu Leu Ser Ala Ile Ser Met Leu Tyr Leu Asp
 65 70 75 80
 Glu Asn Glu Lys Val Val Leu Lys Asn Tyr Gln Asp Met Val Val Glu
 85 90 95
 Gly Cys Gly Cys Arg
 100

<210> 50
 <211> 103
 <212> PRT
 <213> Homo sapiens

<220>
 <223> BMP3

<400> 50
 Cys Ala Arg Arg Tyr Leu Lys Val Asp Phe Ala Asp Ile Gly Trp Ser
 1 5 10 15
 Glu Trp Ile Ile Ser Pro Lys Ser Phe Asp Ala Tyr Tyr Cys Ser Gly
 20 25 30
 Ala Cys Gln Phe Pro Met Pro Lys Ser Leu Lys Pro Ser Asn His Ala
 35 40 45
 Thr Ile Gln Ser Ile Val Arg Ala Val Gly Val Val Pro Gly Ile Pro
 50 55 60
 Glu Pro Cys Cys Val Pro Glu Lys Met Ser Ser Leu Ser Ile Leu Phe
 65 70 75 80
 Phe Asp Glu Asn Lys Asn Val Val Leu Lys Val Tyr Pro Asn Met Thr
 85 90 95
 Val Glu Ser Cys Ala Cys Arg
 100

<210> 51
 <211> 101
 <212> PRT
 <213> Homo sapiens

<220>
 <223> BMP-4

<400> 51

Cys Arg Arg His Ser Leu Tyr Val Asp Phe Ser Asp Val Gly Trp Asn
1 5 10 15
Asp Trp Ile Val Ala Pro Pro Gly Tyr Gln Ala Phe Tyr Cys His Gly
20 25 30
Asp Cys Pro Phe Pro Leu Ala Asp His Leu Asn Ser Thr Asn His Ala
35 40 45
Ile Val Gln Thr Leu Val Asn Ser Val Asn Ser Ser Ile Pro Lys Ala
50 55 60
Cys Cys Val Pro Thr Glu Leu Ser Ala Ile Ser Met Leu Tyr Leu Asp
65 70 75 80
Glu Tyr Asp Lys Val Val Leu Lys Asn Tyr Gln Glu Met Val Val Glu
85 90 95
Gly Cys Gly Cys Arg
100

<210> 52

<211> 102

<212> PRT

<213> Homo sapiens

<220>

<223> BMP-5

<400> 52

Cys Lys Lys His Glu Leu Tyr Val Ser Phe Arg Asp Leu Gly Trp Gln
1 5 10 15
Asp Trp Ile Ile Ala Pro Glu Gly Tyr Ala Ala Phe Tyr Cys Asp Gly
20 25 30
Glu Cys Ser Phe Pro Leu Asn Ala His Met Asn Ala Thr Asn His Ala
35 40 45
Ile Val Gln Thr Leu Val His Leu Met Phe Pro Asp His Val Pro Lys
50 55 60
Pro Cys Cys Ala Pro Thr Lys Leu Asn Ala Ile Ser Val Leu Tyr Phe
65 70 75 80
Asp Asp Ser Ser Asn Val Ile Leu Lys Lys Tyr Arg Asn Met Val Val
85 90 95
Arg Ser Cys Gly Cys His
100

<210> 53
 <211> 102
 <212> PRT
 <213> Homo sapiens

<220>
 <223> BMP-6

<400> 53
 Cys Arg Lys His Glu Leu Tyr Val Ser Phe Gln Asp Leu Gly Trp Gln
 1 5 10 15
 Asp Trp Ile Ile Ala Pro Lys Gly Tyr Ala Ala Asn Tyr Cys Asp Gly
 20 25 30
 Glu Cys Ser Phe Pro Leu Asn Ala His Met Asn Ala Thr Asn His Ala
 35 40 45
 Ile Val Gln Thr Leu Val His Leu Met Asn Pro Glu Tyr Val Pro Lys
 50 55 60
 Pro Cys Cys Ala Pro Thr Lys Leu Asn Ala Ile Ser Val Leu Tyr Phe
 65 70 75 80
 Asp Asp Asn Ser Asn Val Ile Leu Lys Lys Tyr Arg Asn Met Val Val
 85 90 95
 Arg Ala Cys Gly Cys His
 100

<210> 54
 <211> 103
 <212> PRT
 <213> Gallus gallus

<220>
 <223> DORSALIN

<400> 54
 Cys Arg Arg Thr Ser Leu His Val Asn Phe Lys Glu Ile Gly Trp Asp
 1 5 10 15
 Ser Trp Ile Ile Ala Pro Lys Asp Tyr Glu Ala Phe Glu Cys Lys Gly
 20 25 30
 Gly Cys Phe Phe Pro Leu Thr Asp Asn Val Thr Pro Thr Lys His Ala
 35 40 45
 Ile Val Gln Thr Leu Val His Leu Gln Asn Pro Lys Lys Ala Ser Lys
 50 55 60
 Ala Cys Cys Val Pro Thr Lys Leu Asp Ala Ile Ser Ile Leu Tyr Lys
 65 70 75 80

Asp Asp Ala Gly Val Pro Thr Leu Ile Tyr Asn Tyr Glu Gly Met Lys
85 90 95

Val Ala Glu Cys Gly Cys Arg
100

<210> 55
<211> 102
<212> PRT
<213> Homo sapiens

<220>
<223> OP-1

<400> 55
Cys Lys Lys His Glu Leu Tyr Val Ser Phe Arg Asp Leu Gly Trp Gln
1 5 10 15

Asp Trp Ile Ile Ala Pro Glu Gly Tyr Ala Ala Tyr Tyr Cys Glu Gly
20 25 30

Glu Cys Ala Phe Pro Leu Asn Ser Tyr Met Asn Ala Thr Asn His Ala
35 40 45

Ile Val Gln Thr Leu Val His Phe Ile Asn Pro Glu Thr Val Pro Lys
50 55 60

Pro Cys Cys Ala Pro Thr Gln Leu Asn Ala Ile Ser Val Leu Tyr Phe
65 70 75 80

Asp Asp Ser Ser Asn Val Ile Leu Lys Lys Tyr Arg Asn Met Val Val
85 90 95

Arg Ala Cys Gly Cys His
100

<210> 56
<211> 102
<212> PRT
<213> Homo sapiens

<220>
<223> OP-2

<400> 56
Cys Arg Arg His Glu Leu Tyr Val Ser Phe Gln Asp Leu Gly Trp Leu
1 5 10 15

Asp Trp Val Ile Ala Pro Gln Gly Tyr Ser Ala Tyr Tyr Cys Glu Gly
20 25 30

Glu Cys Ser Phe Pro Leu Asp Ser Cys Met Asn Ala Thr Asn His Ala
35 40 45

Ile Leu Gln Ser Leu Val His Leu Met Lys Pro Asn Ala Val Pro Lys
50 55 60

Ala Cys Cys Ala Pro Thr Lys Leu Ser Ala Thr Ser Val Leu Tyr Tyr
65 70 75 80

Asp Ser Ser Asn Asn Val Ile Leu Arg Lys His Arg Asn Met Val Val
85 90 95

Lys Ala Cys Gly Cys His
100

<210> 57
<211> 102
<212> PRT
<213> Mus musculus

<220>
<223> OP-3

<400> 57
Cys Arg Arg His Glu Leu Tyr Val Ser Phe Arg Asp Leu Gly Trp Leu
1 5 10 15

Asp Ser Val Ile Ala Pro Gln Gly Tyr Ser Ala Tyr Tyr Cys Ala Gly
20 25 30

Glu Cys Ile Tyr Pro Leu Asn Ser Cys Met Asn Ser Thr Asn His Ala
35 40 45

Thr Met Gln Ala Leu Val His Leu Met Lys Pro Asp Ile Ile Pro Lys
50 55 60

Val Cys Cys Val Pro Thr Glu Leu Ser Ala Ile Ser Leu Leu Tyr Tyr
65 70 75 80

Asp Arg Asn Asn Asn Val Ile Leu Arg Arg Glu Arg Asn Met Val Val
85 90 95

Gln Ala Cys Gly Cys His
100

<210> 58
<211> 107
<212> PRT
<213> Mus musculus

<220>
<223> GDF-1

<400> 58
Cys Arg Thr Arg Arg Leu His Val Ser Phe Arg Glu Val Gly Trp His
1 5 10 15

Arg Trp Val Ile Ala Pro Arg Gly Phe Leu Ala Asn Phe Cys Gln Gly
 20 25 30
 Thr Cys Ala Leu Pro Glu Thr Leu Arg Gly Pro Gly Gly Pro Pro Ala
 35 40 45
 Leu Asn His Ala Val Leu Arg Ala Leu Met His Ala Ala Ala Pro Thr
 50 55 60
 Pro Gly Ala Gly Ser Pro Cys Cys Val Pro Glu Arg Leu Ser Pro Ile
 65 70 75 80
 Ser Val Leu Phe Phe Asp Asn Ser Asp Asn Val Val Leu Arg His Tyr
 85 90 95
 Glu Asp Met Val Val Asp Glu Cys Gly Cys Arg
 100 105

<210> 59
 <211> 101
 <212> PRT
 <213> Mus musculus

<220>
 <223> GDF-3

<400> 59
 Cys His Arg His Gln Leu Phe Ile Asn Phe Gln Asp Leu Gly Trp His
 1 5 10 15
 Lys Trp Val Ile Ala Pro Lys Gly Phe Met Ala Asn Tyr Cys His Gly
 20 25 30
 Glu Cys Pro Phe Ser Met Thr Thr Tyr Leu Asn Ser Ser Asn Tyr Ala
 35 40 45
 Phe Met Gln Ala Leu Met His Met Ala Asp Pro Lys Val Pro Lys Ala
 50 55 60
 Val Cys Val Pro Thr Lys Leu Ser Pro Ile Ser Met Leu Tyr Gln Asp
 65 70 75 80
 Ser Asp Lys Asn Val Ile Leu Arg His Tyr Glu Asp Met Val Val Asp
 85 90 95
 Glu Cys Gly Cys Gly
 100

<210> 60
 <211> 102
 <212> PRT
 <213> Mus musculus

<220>

<223> GDF-9

<400> 60

Cys Glu Leu His Asp Phe Arg Leu Ser Phe Ser Gln Leu Lys Trp Asp
1 5 10 15
Asn Trp Ile Val Ala Pro His Arg Tyr Asn Pro Arg Tyr Cys Lys Gly
20 25 30
Asp Cys Pro Arg Ala Val Arg His Arg Tyr Gly Ser Pro Val His Thr
35 40 45
Met Val Gln Asn Ile Ile Tyr Glu Lys Leu Asp Pro Ser Val Pro Arg
50 55 60
Pro Ser Cys Val Pro Gly Lys Tyr Ser Pro Leu Ser Val Leu Thr Ile
65 70 75 80
Glu Pro Asp Gly Ser Ile Ala Tyr Lys Glu Tyr Glu Asp Met Ile Ala
85 90 95
Thr Arg Cys Thr Cys Arg
100

<210> 61

<211> 105

<212> PRT

<213> Homo sapiens

<220>

<223> INHIBIN-Alpha

<400> 61

Cys His Arg Val Ala Leu Asn Ile Ser Phe Gln Glu Leu Gly Trp Glu
1 5 10 15
Arg Trp Ile Val Tyr Pro Pro Ser Phe Ile Phe His Tyr Cys His Gly
20 25 30
Gly Cys Gly Leu His Ile Pro Pro Asn Leu Ser Leu Pro Val Pro Gly
35 40 45
Ala Pro Pro Thr Pro Ala Gln Pro Tyr Ser Leu Leu Pro Gly Ala Gln
50 55 60
Pro Cys Cys Ala Ala Leu Pro Gly Thr Met Arg Pro Leu His Val Arg
65 70 75 80
Thr Thr Ser Asp Gly Gly Tyr Ser Phe Lys Tyr Glu Thr Val Pro Asn
85 90 95
Leu Leu Thr Gln His Cys Ala Cys Ile
100 105

<210> 62
 <211> 106
 <212> PRT
 <213> Bos taurus

<220>
 <223> INHIBIN-BetaA

<400> 62
 Cys Cys Lys Lys Gln Phe Phe Val Ser Phe Lys Asp Ile Gly Trp Asn
 1 5 10 15
 Asp Trp Ile Ile Ala Pro Ser Gly Tyr His Ala Asn Tyr Cys Glu Gly
 20 25 30
 Glu Cys Pro Ser His Ile Ala Gly Thr Ser Gly Ser Ser Leu Ser Phe
 35 40 45
 His Ser Thr Val Ile Asn His Tyr Arg Met Arg Gly His Ser Pro Phe
 50 55 60
 Ala Asn Leu Lys Ser Cys Cys Val Pro Thr Lys Leu Arg Pro Met Ser
 65 70 75 80
 Met Leu Tyr Tyr Asp Asp Gly Gln Asn Ile Ile Lys Lys Asp Ile Gln
 85 90 95
 Asn Met Ile Val Glu Glu Cys Gly Cys Ser
 100 105

<210> 63
 <211> 106
 <212> PRT
 <213> Homo sapiens

<220>
 <223> INHIBIN-BetaB

<400> 63
 Cys Cys Lys Lys Gln Phe Phe Val Ser Phe Lys Asp Ile Gly Trp Asn
 1 5 10 15
 Asp Trp Ile Ile Ala Pro Ser Gly Tyr His Ala Asn Tyr Cys Glu Gly
 20 25 30
 Glu Cys Pro Ser His Ile Ala Gly Thr Ser Gly Ser Ser Leu Ser Phe
 35 40 45
 His Ser Thr Val Ile Asn His Tyr Arg Met Arg Gly His Ser Pro Phe
 50 55 60
 Ala Asn Leu Lys Ser Cys Cys Val Pro Thr Lys Leu Arg Pro Met Ser
 65 70 75 80

Met Leu Tyr Tyr Asp Asp Gly Gln Asn Ile Ile Lys Lys Asp Ile Gln
85 90 95

Asn Met Ile Val Glu Glu Cys Gly Cys Ser
100 105

<210> 64

<211> 98

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: TGF-B
SUBGROUP SEQUENCE PATTERN

<220>

<223> Each Xaa is independently selected from a group of
one or more specified amino acids as defined in
the specification

<400> 64

Cys Cys Val Arg Pro Leu Tyr Ile Asp Phe Arg Xaa Asp Leu Gly Trp
1 5 10 15

Lys Trp Ile His Glu Pro Lys Gly Tyr Xaa Ala Asn Phe Cys Xaa Gly
20 25 30

Xaa Cys Pro Tyr Xaa Trp Ser Xaa Asp Thr Gln Xaa Ser Xaa Val Leu
35 40 45

Xaa Leu Tyr Asn Xaa Xaa Asn Pro Xaa Ala Ser Ala Xaa Pro Cys Cys
50 55 60

Val Pro Gln Xaa Leu Glu Pro Leu Xaa Ile Xaa Tyr Tyr Val Gly Arg
65 70 75 80

Xaa Xaa Lys Val Glu Gln Leu Ser Asn Met Xaa Val Xaa Ser Cys Lys
85 90 95

Cys Ser

<210> 65

<211> 104

<212> PRT

<213> Artificial Sequence

<220>

<223> Each Xaa is independently selected from a group of
one or more specified amino acids as defined in
the specification

<220>

<223> Description of Artificial Sequence: VG/DPP
SUBGROUP SEQUENCE PATTERN

<400> 65

```

Cys Xaa Xaa Xaa Xaa Leu Tyr Val Xaa Phe Xaa Asp Xaa Gly Trp Xaa
 1             5             10             15

Asp Trp Ile Ile Ala Pro Xaa Gly Tyr Xaa Ala Xaa Tyr Cys Xaa Gly
          20             25             30

Xaa Cys Xaa Phe Pro Leu Xaa Xaa Xaa Xaa Asn Xaa Thr Asn His Ala
          35             40             45

Ile Xaa Gln Thr Leu Val Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Pro
 50             55             60

Lys Xaa Cys Cys Xaa Pro Thr Xaa Leu Xaa Ala Xaa Ser Xaa Leu Tyr
 65             70             75             80

Xaa Asp Xaa Xaa Xaa Xaa Xaa Val Xaa Leu Xaa Xaa Tyr Xaa Xaa Met
          85             90             95

Xaa Val Xaa Xaa Cys Gly Cys Xaa
          100

```

<210> 66

<211> 107

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: GDF SUBGROUP
PATTERN

<220>

<223> Each Xaa is independently selected from a group of
one or more specified amino acids as defined in
the specification

<400> 66

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Cys Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Phe Xaa Xaa Xaa Xaa Trp Xaa
 1             5             10             15

Xaa Trp Xaa Xaa Ala Pro Xaa Xaa Xaa Xaa Xaa Xaa Xaa Cys Xaa Gly
          20             25             30

Xaa Cys Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
          35             40             45

Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
          50             55             60

Pro Xaa Xaa Xaa Xaa Xaa Xaa Cys Val Pro Xaa Xaa Xaa Ser Pro Xaa
 65             70             75             80

```


Ser Xaa Leu Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Tyr
85 90 95

Glu Asp Met Xaa Xaa Xaa Xaa Cys Xaa Cys Xaa
100 105

<210> 67
<211> 109
<212> PRT
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: INHIBIN
SUBGROUP PATTERN

<220>
<223> Each Xaa is independently selected from a group of
one or more specified amino acids as defined in
the specification

<400> 67
Cys Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Phe Xaa Xaa Xaa Gly Trp Xaa
1 5 10 15
Xaa Trp Ile Xaa Xaa Pro Xaa Xaa Xaa Xaa Xaa Xaa Tyr Cys Xaa Gly
20 25 30
Xaa Cys Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
35 40 45
Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
50 55 60
Xaa Xaa Xaa Xaa Xaa Cys Cys Xaa Xaa Xaa Pro Xaa Xaa Xaa Xaa Xaa
65 70 75 80
Xaa Xaa Xaa Xaa Xaa Xaa Xaa Asp Xaa Xaa Xaa Xaa Xaa Xaa Xaa Xaa
85 90 95
Xaa Xaa Xaa Asn Xaa Xaa Xaa Xaa Xaa Cys Xaa Cys Xaa
100 105

<210> 68
<211> 139
<212> PRT
<213> Homo sapiens

<220>
<223> Mature H2223 mutant

<400> 68
Ser Thr Gly Ser Lys Gln Arg Ser Gln Asn Arg Ser Lys Thr Pro Lys
1 5 10 15

Asn Gln Glu Ala Leu Arg Met Ala Asn Val Ala Glu Asn Ser Ser Ser
 20 25 30
 Asp Gln Arg Gln Ala Cys Lys Lys His Glu Leu Tyr Val Ser Phe Arg
 35 40 45
 Asp Leu Gly Trp Gln Asp Trp Ile Ile Ala Pro Glu Gly Tyr Ala Ala
 50 55 60
 Tyr Tyr Cys Glu Gly Glu Cys Ala Phe Pro Leu Asn Ser Tyr Met Asn
 65 70 75 80
 Ala Thr Asn His Ala Ile Val Gln Thr Leu Val His Phe Ile Asn Pro
 85 90 95
 Glu Thr Val Pro Lys Pro Cys Cys Ala Pro Thr Gln Leu Asn Ala Ile
 100 105 110
 Ser Val Leu Tyr Phe Asp Asp Ser Ser Asn Val Ile Leu Lys Lys Tyr
 115 120 125
 Glu Asp Met Val Val Glu Ala Cys Gly Cys Arg
 130 135

<210> 69
 <211> 117
 <212> PRT
 <213> Homo sapiens

<220>
 <223> Trypsin truncated H2223 mutant

<400> 69
 Met Ala Asn Val Ala Glu Asn Ser Ser Ser Asp Gln Arg Gln Ala Cys
 1 5 10 15
 Lys Lys His Glu Leu Tyr Val Ser Phe Arg Asp Leu Gly Trp Gln Asp
 20 25 30
 Trp Ile Ile Ala Pro Glu Gly Tyr Ala Ala Tyr Tyr Cys Glu Gly Glu
 35 40 45
 Cys Ala Phe Pro Leu Asn Ser Tyr Met Asn Ala Thr Asn His Ala Ile
 50 55 60
 Val Gln Thr Leu Val His Phe Ile Asn Pro Glu Thr Val Pro Lys Pro
 65 70 75 80
 Cys Cys Ala Pro Thr Gln Leu Asn Ala Ile Ser Val Leu Tyr Phe Asp
 85 90 95
 Asp Ser Ser Asn Val Ile Leu Lys Lys Tyr Glu Asp Met Val Val Glu
 100 105 110

Ala Cys Gly Cys Arg
115

<210> 70
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer #1

<220>
<221> CDS
<222> (1)..(33)

<400> 70
gcg ccc acg cag ctc agc gct atc tcc gtc ctc 33
Ala Pro Thr Gln Leu Ser Ala Ile Ser Val Leu
1 5 10

<210> 71
<211> 11
<212> PRT
<213> Artificial Sequence

<400> 71
Ala Pro Thr Gln Leu Ser Ala Ile Ser Val Leu
1 5 10

<210> 72
<211> 43
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer #2

<400> 72
ctatctgcag ccacaagctt cgaccacat gtcttcgtat ttc 43

<210> 73
<211> 43
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: complement of
Primer #2

<220>
<221> CDS

<222> (2)..(43)

<400> 73

g aaa tac gaa gac atg gtg gtc gaa gct tgt ggc tgc aga tag 43
Lys Tyr Glu Asp Met Val Val Glu Ala Cys Gly Cys Arg
1 5 10

<210> 74

<211> 13

<212> PRT

<213> Artificial Sequence

<400> 74

Lys Tyr Glu Asp Met Val Val Glu Ala Cys Gly Cys Arg
1 5 10

<210> 75

<211> 44

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:the sequence
between the T7 promoter, at the XbaI site, and the
ATG codon

<400> 75

tctagaataa ttttgtttaa cctttaagaa ggagatatac gatg 44

<210> 76

<211> 19

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer #3

<400> 76

taatacgact cactatagg 19

<210> 77

<211> 18

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence: Primer #4

<400> 77

gctgagctgc gtgggcgc 18

<210> 78
<211> 18
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: complement of
Primer #4

<220>
<221> CDS
<222> (1)..(18)

<400> 78
gcg ccc acg cag ctc agc
Ala Pro Thr Gln Leu Ser
1 5

18

<210> 79
<211> 6
<212> PRT
<213> Artificial Sequence

<400> 79
Ala Pro Thr Gln Leu Ser
1 5

<210> 80
<211> 23
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: Primer #5

<400> 80
ggatcctatc tgcagccaca agc

23

<210> 81
<211> 23
<212> DNA
<213> Artificial Sequence

<220>
<223> Description of Artificial Sequence: complement of
Primer #5

<220>
<221> CDS
<222> (1)..(18)

<400> 81

gct tgt ggc tgc aga tag gatcc
 Ala Cys Gly Cys Arg
 1 5

23

<210> 82
 <211> 5
 <212> PRT
 <213> Artificial Sequence

<400> 82
 Ala Cys Gly Cys Arg
 1 5

<210> 83
 <211> 102
 <212> PRT
 <213> Homo sapiens

<220>
 <223> CDMP-1/GDF-5

<400> 83
 Cys Ser Arg Lys Ala Leu His Val Asn Phe Lys Asp Met Gly Trp Asp
 1 5 10 15
 Asp Trp Ile Ile Ala Pro Leu Glu Tyr Glu Ala Phe His Cys Glu Gly
 20 25 30
 Leu Cys Glu Phe Pro Leu Arg Ser His Leu Glu Pro Thr Asn His Ala
 35 40 45
 Val Ile Gln Thr Leu Met Asn Ser Met Asp Pro Glu Ser Thr Pro Pro
 50 55 60
 Thr Cys Cys Val Pro Thr Arg Leu Ser Pro Ile Ser Ile Leu Phe Ile
 65 70 75 80
 Asp Ser Ala Asn Asn Val Val Tyr Lys Gln Tyr Glu Asp Met Val Val
 85 90 95
 Glu Ser Cys Gly Cys Arg
 100

<210> 84
 <211> 102
 <212> PRT
 <213> Homo sapiens

<220>
 <223> CDMP-2/GDF-6

<400> 84

Cys Ser Lys Lys Pro Leu His Val Asn Phe Lys Glu Leu Gly Trp Asp
 1 5 10 15
 Asp Trp Ile Ile Ala Pro Leu Glu Tyr Glu Ala Tyr His Cys Glu Gly
 20 25 30
 Val Cys Asp Phe Pro Leu Arg Ser His Leu Glu Pro Thr Asn His Ala
 35 40 45
 Ile Ile Gln Thr Leu Met Asn Ser Met Asp Pro Gly Ser Thr Pro Pro
 50 55 60
 Ser Cys Cys Val Pro Thr Lys Leu Thr Pro Ile Ser Ile Leu Tyr Ile
 65 70 75 80
 Asp Ala Gly Asn Asn Val Val Tyr Lys Gln Tyr Glu Asp Met Val Val
 85 90 95
 Glu Ser Cys Gly Cys Arg
 100

<210> 85
 <211> 102
 <212> PRT
 <213> Mus musculus

<220>
 <223> GDF-6

<400> 85
 Cys Ser Arg Lys Pro Leu His Val Asn Phe Lys Glu Leu Gly Trp Asp
 1 5 10 15
 Asp Trp Ile Ile Ala Pro Leu Glu Tyr Glu Ala Tyr His Cys Glu Gly
 20 25 30
 Val Cys Asp Phe Pro Leu Arg Ser His Leu Glu Pro Thr Asn His Ala
 35 40 45
 Ile Ile Gln Thr Leu Met Asn Ser Met Asp Pro Gly Ser Thr Pro Pro
 50 55 60
 Ser Cys Cys Val Pro Thr Lys Leu Thr Pro Ile Ser Ile Leu Tyr Ile
 65 70 75 80
 Asp Ala Gly Asn Asn Val Val Tyr Lys Gln Tyr Glu Asp Met Val Val
 85 90 95
 Glu Ser Cys Gly Cys Arg
 100

<210> 86
 <211> 102

<212> PRT
<213> Bos taurus

<220>
<223> CDMP-2

<400> 86

Cys	Ser	Lys	Lys	Pro	Leu	His	Val	Asn	Phe	Lys	Glu	Leu	Gly	Trp	Asp
1				5					10					15	
Asp	Trp	Ile	Ile	Ala	Pro	Leu	Glu	Tyr	Glu	Ala	Tyr	His	Cys	Glu	Gly
		20						25					30		
Val	Cys	Asp	Phe	Pro	Leu	Arg	Ser	His	Leu	Glu	Pro	Thr	Asn	His	Ala
		35					40					45			
Ile	Ile	Gln	Thr	Leu	Met	Asn	Ser	Met	Asp	Pro	Gly	Ser	Thr	Pro	Pro
	50					55					60				
Ser	Cys	Cys	Val	Pro	Thr	Lys	Leu	Thr	Pro	Ile	Ser	Ile	Leu	Tyr	Ile
65					70					75					80
Asp	Ala	Gly	Asn	Asn	Val	Val	Tyr	Asn	Glu	Tyr	Glu	Glu	Met	Val	Val
			85						90					95	
Glu	Ser	Cys	Gly	Cys	Arg										
			100												

<210> 87
<211> 102
<212> PRT
<213> Mus musculus

<220>
<223> GDF-7

<400> 87

Cys	Ser	Arg	Lys	Ser	Leu	His	Val	Asp	Phe	Lys	Glu	Leu	Gly	Trp	Asp
1				5					10					15	
Asp	Trp	Ile	Ile	Ala	Pro	Leu	Asp	Tyr	Glu	Ala	Tyr	His	Cys	Glu	Gly
		20						25					30		
Val	Cys	Asp	Phe	Pro	Leu	Arg	Ser	His	Leu	Glu	Pro	Thr	Asn	His	Ala
		35					40					45			
Ile	Ile	Gln	Thr	Leu	Leu	Asn	Ser	Met	Ala	Pro	Asp	Ala	Ala	Pro	Ala
	50					55					60				
Ser	Cys	Cys	Val	Pro	Ala	Arg	Leu	Ser	Pro	Ile	Ser	Ile	Leu	Tyr	Ile
65					70					75					80
Asp	Ala	Ala	Asn	Asn	Val	Val	Tyr	Lys	Gln	Tyr	Glu	Asp	Met	Val	Val
			85						90					95	

Glu Ala Cys Gly Cys Arg
100

<210> 88
<211> 102
<212> PRT
<213> Homo sapiens

<220>
<223> CDMP-3 construct

<400> 88
Cys Ser Arg Lys Pro Leu His Val Asp Phe Lys Glu Leu Gly Trp Asp
1 5 10 15
Asp Trp Ile Ile Ala Pro Leu Asp Tyr Glu Ala Tyr His Cys Glu Gly
20 25 30
Leu Cys Asp Phe Pro Leu Arg Ser His Leu Glu Pro Thr Asn His Ala
35 40 45
Ile Ile Gln Thr Leu Leu Asn Ser Met Ala Pro Asp Ala Ala Pro Ala
50 55 60
Ser Cys Cys Val Pro Ala Arg Leu Ser Pro Ile Ser Ile Leu Tyr Ile
65 70 75 80
Asp Ala Ala Asn Asn Val Val Tyr Lys Gln Tyr Glu Asp Met Val Val
85 90 95
Glu Ala Cys Gly Cys Arg
100

<210> 89
<211> 129
<212> PRT
<213> Homo sapiens

<220>
<223> H2487

<400> 89
Met Thr Met Ile Thr Asn Ser Leu Ala Ser Trp Arg Glu Pro Ser Phe
1 5 10 15
Met Ala Leu Ser Ser Ser Asp Gln Arg Gln Ala Cys Lys Lys His Glu
20 25 30
Leu Tyr Val Ser Phe Arg Asp Leu Gly Trp Gln Asp Trp Ile Ile Ala
35 40 45

Pro Glu Gly Tyr Ala Ala Tyr Tyr Cys Glu Gly Glu Cys Ala Phe Pro
50 55 60

Leu Asn Ser Tyr Met Asn Ala Thr Asn His Ala Ile Val Gln Thr Leu
65 70 75 80

Val His Phe Ile Asn Pro Glu Thr Val Pro Lys Pro Cys Cys Ala Pro
85 90 95

Thr Gln Leu Ser Ala Ile Ser Val Leu Tyr Phe Asp Asp Ser Ser Asn
100 105 110

Val Ile Leu Lys Lys Tyr Glu Asp Met Val Val Glu Ala Cys Gly Cys
115 120 125

Arg

<210> 90
<211> 405
<212> DNA
<213> Homo sapiens

<220>
<223> H2487

<400> 90
atgaccatga ttacgaattc cctggccagc tggagagagc caagcttcat ggccttaagc 60
agcagcgacc agaggcaggc ctgtaagaag cagcagctgt atgtcagctt ccgagacctg 120
ggctggcagg actggatcat cgcgctgaa ggctacgccg cctactactg tgagggggag 180
tgtgccttcc ctctgaactc ctacatgaac gccaccaacc acgccatcgt gcagacgctg 240
gtccacttca tcaaccgga aacggtgccc aagccctgct gtgcgcccac gcagctcagc 300
gctatctccg tcctctactt cgatgacagc tccaacgtca tcctgaagaa atacgaagac 360
atggtggtcg aagcttgtgg ctgcagatag ctctccgag aattc 405

<210> 91
<211> 46
<212> PRT
<213> Homo sapiens

<220>
<223> H2440

<400> 91

Met Ala Asp Asn His His His His His His Met Gly Ser Lys Gln Arg
1 5 10 15

Ser Gln Asn Arg Ser Lys Thr Pro Lys Asn Gln Glu Ala Leu Arg Met
 20 25 30

Ala Asn Val Ala Glu Asn Ser Ser Ser Asp Gln Arg Gln Ala
 35 40 45

<210> 92
 <211> 143
 <212> DNA
 <213> Homo sapiens

<220>
 <223> H2440

<400> 92
 ccatggctga caaccatcac catcatcatc accatatggg gagcaaacag cgcagccaga 60
 accgctcaa gacgccaaag aaccaggaag ccctgcggat ggccaacgtg gcagagaaca 120
 gcagcagcga ccagaggcag gcc 143

<210> 93
 <211> 241
 <212> DNA
 <213> Homo sapiens

<220>
 <223> H2521

<400> 93
 atgatcgaat tcatggctga caacaaattc aacaaggaac agcagaacgc gttctacgag 60
 atcttgcacc tgccgaacct gaacgaagag cagcgtaacg gcttcatcca aagcctgaaa 120
 gaagagccgt ctgagtctgc gaatctgcta gcggatgcca agaaactgaa cgatgcgcag 180
 gcaccgaaat cggccatggc caacgtggca gagaacagca gcagcgacca gaggcaggcc 240
 t 241

<210> 94
 <211> 80
 <212> PRT
 <213> Homo sapiens

<220>
 <223> H2521

<400> 94
Met Ile Glu Phe Met Ala Asp Asn Lys Phe Asn Lys Glu Gln Gln Asn
1 5 10 15
Ala Phe Tyr Glu Ile Leu His Leu Pro Asn Leu Asn Glu Glu Gln Arg
20 25 30
Asn Gly Phe Ile Gln Ser Leu Lys Glu Glu Pro Ser Gln Ser Ala Asn
35 40 45
Leu Leu Ala Asp Ala Lys Lys Leu Asn Asp Ala Gln Ala Pro Lys Ser
50 55 60
Ala Met Ala Asn Val Ala Glu Asn Ser Ser Ser Asp Gln Arg Gln Ala
65 70 75 80

<210> 95
<211> 334
<212> DNA
<213> Homo sapiens

<220>
<223> H2525

<400> 95
atgatcgaat tcatgggctga caacaaattc aacaaggaac agcagaacgc gttctacgag 60
atcttgcacc tgccgaacct gaacgaagag cagcgtaacg gcttcatcca aagcctgaaa 120
gaagagccgt ctcagtctgc gaatctgcta gcggatgcc aaaaactgaa cgatgcgcag 180
gcaccgaaat cggccatggc tgacaacccat caccatcatc accatatggg gagcaaacag 240
cgagccaga accgctccaa gacgccaag aaccaggaag ccctgcggat ggccaacgtg 300
gcagagaaca gcagcagcga ccagaggcag gcct 334

<210> 96
<211> 111
<212> PRT
<213> Homo sapiens

<220>
<223> H2525

<400> 96
Met Ile Glu Phe Met Ala Asp Asn Lys Phe Asn Lys Glu Gln Gln Asn
1 5 10 15
Ala Phe Tyr Glu Ile Leu His Leu Pro Asn Leu Asn Glu Glu Gln Arg
20 25 30

Leu Leu Ala Asp Ala Lys Lys Leu Asn Asp Ala Gln Ala Pro Lys Ser
 50 55 60

Asp His His His His His His Ser Asp Pro Met Ala Asn Val Ala Glu
 65 70 75 80

Asn Ser Ser Ser Asp Gln Arg Gln Ala
 85

<210> 99
 <211> 647
 <212> DNA
 <213> Homo sapiens

<220>
 <223> H2528

<400> 99
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 agatcttgca cctgccgaac ctgaacgaag agcagcgtaa cggcttcac caaagcctga 120
 aagaagagcc gtctcagtct gcgaatctgc tagcggatgc caagaaactg aacgatgcgc 180
 aggcaccgaa atcggatcat catcaccatc accactcgga tcccatggcg ttggccggga 240
 cggttacagc gcagggcagc ggcgagggtg ccggcagagg tcatggtcga cgtggtagat 300
 ctcgctgcag ccgcaagccg ttgcacgtgg acttcaagga gctcggctgg gacgactgga 360
 tcatcgcgcc gctggactac gaggcgtacc actgcgaggg cctttgcgac ttccctttgc 420
 gttcgcacct cgagcccacc aaccatgcc aattcagac gctgctcaac tccatggcac 480
 cagacgcggc gccggcctcc tgctgtgtgc cagcgcgcct cagccccatc agcatcctct 540
 acatcgacgc cgccaacaac gttgtctaca agcaatacga ggacatgggtg gtggaggcct 600
 gcggctgtag gtaagcttgt ggctgcagat agctcctccg agaattc 647

<210> 100
 <211> 203
 <212> PRT
 <213> Homo sapiens

<220>
 <223> H2528

<400> 100
 Met Ile Glu Phe Met Ala Asp Asn Lys Phe Asn Lys Glu Gln Gln Asn
 1 5 10 15

Ala Phe Tyr Glu Ile Leu His Leu Pro Asn Leu Asn Glu Glu Gln Arg
 20 25 30
 Asn Gly Phe Ile Gln Ser Leu Lys Glu Glu Pro Ser Gln Ser Ala Asn
 35 40 45
 Leu Leu Ala Asp Ala Lys Lys Leu Asn Asp Ala Gln Ala Pro Lys Ser
 50 55 60
 Asp His His His His His His Ser Asp Pro Met Ala Leu Ala Gly Thr
 65 70 75 80
 Arg Thr Ala Gln Gly Ser Gly Gly Gly Ala Gly Arg Gly His Gly Arg
 85 90 95
 Arg Gly Arg Ser Arg Cys Ser Arg Lys Pro Leu His Val Asp Phe Lys
 100 105 110
 Glu Leu Gly Trp Asp Asp Trp Ile Ile Ala Pro Leu Asp Tyr Glu Ala
 115 120 125
 Tyr His Cys Glu Gly Leu Cys Asp Phe Pro Leu Arg Ser His Leu Glu
 130 135 140
 Pro Thr Asn His Ala Ile Ile Gln Thr Leu Leu Asn Ser Met Ala Pro
 145 150 155 160
 Asp Ala Ala Pro Ala Ser Cys Cys Val Pro Ala Arg Leu Ser Pro Ile
 165 170 175
 Ser Ile Leu Tyr Ile Asp Ala Ala Asn Asn Val Val Tyr Lys Gln Tyr
 180 185 190
 Glu Asp Met Val Val Glu Ala Cys Gly Cys Arg
 195 200

<210> 101
 <211> 47
 <212> DNA
 <213> Homo sapiens

<220>
 <223> H2469

<400> 101
 ccatggccaa cgtggcagag aacagcagca gcgaccagag gcaggcc

47

<210> 102
 <211> 15
 <212> PRT
 <213> Homo sapiens

<220>

<223> H2469

<400> 102

Met Ala Asn Val Ala Glu Asn Ser Ser Ser Asp Gln Arg Gln Ala
1 5 10 15

<210> 103

<211> 129

<212> DNA

<213> Homo sapiens

<220>

<223> H2510

<400> 103

atgtccacgg ggagcaaaca gcgcagccag aaccgctcca agacgcccaa gaaccaggaa 60
gccctgcgga tggccagctg gagagagcca agcttcatgg ccttaagcag cagcgaccag 120
aggcaggcc 129

<210> 104

<211> 43

<212> PRT

<213> Homo sapiens

<220>

<223> H2510

<400> 104

Met Ser Thr Gly Ser Lys Gln Arg Ser Gln Asn Arg Ser Lys Thr Pro
1 5 10 15

Lys Asn Gln Glu Ala Leu Arg Met Ala Ser Trp Arg Glu Pro Ser Phe
20 25 30

Met Ala Leu Ser Ser Ser Asp Gln Arg Gln Ala
35 40

<210> 105

<211> 168

<212> DNA

<213> Homo sapiens

<220>

<223> H2523

<400> 105

atgtccacgg ggagcaaaca gcgcagccag aaccgctcca agacgcccaa gaaccaggaa 60
gccctgcgga tggccagctg gagagagcca agcttcatgg ccttaagcag cagcgaccag 120

aggcaggcca acgtggcaga gaacagcagc agcgaccaga ggcaggcc

168

<210> 106
<211> 56
<212> PRT
<213> Homo sapiens

<220>
<223> H2523

<400> 106
Met Ser Thr Gly Ser Lys Gln Arg Ser Gln Asn Arg Ser Lys Thr Pro
1 5 10 15
Lys Asn Gln Glu Ala Leu Arg Met Ala Ser Trp Arg Glu Pro Ser Phe
20 25 30
Met Ala Leu Ser Ser Ser Asp Gln Arg Gln Ala Asn Val Ala Glu Asn
35 40 45
Ser Ser Ser Asp Gln Arg Gln Ala
50 55

<210> 107
<211> 194
<212> DNA
<213> Homo sapiens

<220>
<223> H2524

<400> 107
ccatggctga caaccatcac catcatcacc atatggggag caaacagcgc agccagaacc 60
gctccaagac gcccaagaac caggaagccc tgcggatggc cagctggaga gagccaagct 120
tcatggcctt aagcagcagc gaccagaggc aggccaacgt ggcagagaac agcagcagcg 180
accagaggca ggcc 194

<210> 108
<211> 64
<212> PRT
<213> Homo sapiens

<220>
<223> H2524

<400> 108
Met Ala Asp Asn His His His His His His Met Gly Ser Lys Gln Arg
1 5 10 15

Ser Gln Asn Arg Ser Lys Thr Pro Lys Asn Gln Glu Ala Leu Arg Met
20 25 30

Ala Ser Trp Arg Glu Pro Ser Phe Met Ala Leu Ser Ser Ser Asp Gln
35 40 45

Arg Gln Ala Asn Val Ala Glu Asn Ser Ser Ser Asp Gln Arg Gln Ala
50 55 60

<210> 109
<211> 39
<212> PRT
<213> Homo sapiens

<220>
<223> 2421

<400> 109
Pro Thr Cys Cys Val Pro Thr Arg Leu Ser Pro Ile Ser Ile Leu Phe
1 5 10 15

Ile Asp Ala Ser Asn Asn Val Val Leu Lys Lys Tyr Arg Asn Met Val
20 25 30

Val Arg Ala Cys Gly Cys Arg
35

<210> 110
<211> 39
<212> PRT
<213> Homo sapiens

<220>
<223> H2406

<400> 110
Asn Ser Cys Cys Val Pro Thr Lys Leu Thr Pro Ile Ser Ile Leu Tyr
1 5 10 15

Phe Asp Asp Ser Ser Asn Val Ile Leu Lys Lys Tyr Arg Asn Met Val
20 25 30

Val Arg Ala Cys Gly Cys Arg
35

<210> 111
<211> 39
<212> PRT
<213> Homo sapiens

<220>
<223> 2410

<400> 111
 Asn Ser Cys Cys Val Pro Thr Glu Leu Ser Ala Ile Ser Met Leu Tyr
 1 5 10 15
 Leu Asp Glu Asn Glu Lys Val Val Leu Lys Asn Tyr Gln Asp Met Val
 20 25 30
 Val Glu Gly Cys Gly Cys Arg
 35

<210> 112
 <211> 39
 <212> PRT
 <213> Homo sapiens

<220>
 <223> 2247

<400> 112
 Lys Pro Cys Cys Ala Pro Thr Gln Leu Asn Ala Ile Ser Val Leu Tyr
 1 5 10 15
 Phe Asp Asp Ser Ser Asn Val Ile Leu Lys Lys Tyr Arg Asn Met Val
 20 25 30
 Val Arg Ala Cys Gly Cys Arg
 35

<210> 113
 <211> 39
 <212> PRT
 <213> Homo sapiens

<220>
 <223> 2234

<400> 113
 Lys Pro Cys Cys Ala Pro Thr Gln Leu Asn Ala Ile Ser Val Leu Tyr
 1 5 10 15
 Phe Asp Asp Ser Ser Asn Val Ile Leu Lys Lys Tyr Glu Asp Met Val
 20 25 30
 Val Arg Ala Cys Gly Cys Arg
 35

<210> 114
 <211> 39
 <212> PRT
 <213> Homo sapiens

<220>

<223> 2233

<400> 114

Lys Pro Cys Cys Ala Pro Thr Gln Leu Asn Ala Ile Ser Val Leu Tyr
1 5 10 15

Phe Asp Asp Ser Ser Asn Val Ile Leu Lys Lys Tyr Glu Asp Met Val
20 25 30

Val Glu Ala Cys Gly Cys Arg
35

<210> 115

<211> 39

<212> PRT

<213> Homo sapiens

<220>

<223> 2418

<400> 115

Asn Ser Cys Cys Val Pro Thr Lys Leu Thr Pro Ile Ser Val Leu Tyr
1 5 10 15

Phe Asp Asp Ser Ser Asn Val Ile Leu Lys Lys Tyr Glu Asp Met Val
20 25 30

Val Glu Ser Cys Gly Cys Arg
35

<210> 116

<211> 39

<212> PRT

<213> Homo sapiens

<220>

<223> 2443

<400> 116

Asn Ser Cys Cys Val Pro Thr Lys Leu Thr Pro Ile Ser Val Leu Tyr
1 5 10 15

Phe Asp Asp Ser Ser Asn Val Ile Leu Lys Lys Tyr Glu Asp Met Val
20 25 30

Val Arg Ser Cys Gly Cys Arg
35

<210> 117

<211> 39

<212> PRT

<213> Homo sapiens

<220>
<223> 2447

<400> 117

Asn Ser Cys Cys Val Pro Thr Glu Leu Ser Ala Ile Ser Val Leu Tyr
1 5 10 15
Phe Asp Asp Ser Ser Asn Val Ile Leu Lys Lys Tyr Glu Asp Met Val
20 25 30
Val Glu Ala Cys Gly Cys Arg
35

<210> 118
<211> 39
<212> PRT
<213> Homo sapiens

<220>
<223> 2457

<400> 118

Asn Ser Cys Cys Val Pro Thr Glu Leu Asn Ala Ile Ser Val Leu Tyr
1 5 10 15
Phe Asp Asp Ser Ser Asn Val Ile Leu Lys Lys Tyr Glu Asp Met Val
20 25 30
Val Glu Ala Cys Gly Cys Arg
35

<210> 119
<211> 39
<212> PRT
<213> Homo sapiens

<220>
<223> 2456

<400> 119

Lys Pro Cys Cys Ala Pro Thr Glu Leu Ser Ala Ile Ser Val Leu Tyr
1 5 10 15
Phe Asp Asp Ser Ser Asn Val Ile Leu Lys Lys Tyr Glu Asp Met Val
20 25 30
Val Glu Ala Cys Gly Cys Arg
35

<210> 120
<211> 39

<212> PRT
<213> Homo sapiens

<220>
<223> 2460

<400> 120
Lys Pro Cys Cys Ala Pro Thr Gln Leu Ser Ala Ile Ser Val Leu Tyr
1 5 10 15
Phe Asp Asp Ser Ser Asn Val Ile Leu Lys Lys Tyr Glu Asp Met Val
20 25 30
Val Glu Ala Cys Gly Cys Arg
35

<210> 121
<211> 39
<212> PRT
<213> Homo sapiens

<220>
<223> 2449

<400> 121
Lys Pro Cys Cys Ala Pro Thr Glu Leu Asn Ala Ile Ser Val Leu Tyr
1 5 10 15
Phe Asp Asp Ser Ser Asn Val Ile Leu Lys Lys Tyr Arg Asn Met Val
20 25 30
Val Arg Ala Cys Gly Cys Arg
35

<210> 122
<211> 39
<212> PRT
<213> Homo sapiens

<220>
<223> 2467

<400> 122
Lys Pro Cys Cys Ala Pro Thr Glu Leu Ser Ala Ile Ser Val Leu Tyr
1 5 10 15
Phe Asp Asp Ser Ser Asn Val Ile Leu Lys Lys Tyr Arg Asn Met Val
20 25 30
Val Arg Ala Cys Gly Cys Arg
35

<210> 123
<211> 39
<212> PRT
<213> Homo sapiens

<220>
<223> 2464

<400> 123
Lys Pro Cys Cys Ala Pro Thr Gln Leu Ser Ala Ile Ser Val Leu Tyr
1 5 10 15
Phe Asp Asp Ser Ser Asn Val Ile Leu Lys Lys Tyr Arg Asn Met Val
20 25 30
Val Arg Ala Cys Gly Cys Arg
35

B¹¹
<210> 124
<211> 14
<212> PRT
<213> Homo sapiens

<220>
<223> BMP-2 N-Terminus

<400> 124
Met Gln Ala Lys His Lys Gln Arg Lys Arg Leu Lys Ser Ser
1 5 10
